New security tech monitors power use for warning signs of cyberattacks

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A small box collects data on power use for analysis by AI software. Credit: University of Waterloo

Researchers have developed new technology to protect governments, businesses and other organizations from cyberattacks by monitoring for

unusual power consumption.

The technology combines a small piece of hardware to collect data with artificial intelligence (AI) software that can determine if power usage in a system is inconsistent with known, predictable patterns. If so, the AI sends an alert to security officials within the organization that its infrastructure might be under attack by hackers or malicious ransomware stealing or locking crucial information.

"If suddenly, for instance, several machines exhibit a similar pattern of high-power usage in specific patterns, we would raise an alert that there might be spreading crypto-ransomware in the network," said Sebastian Fischmeister, an engineering and computer science professor at the University of Waterloo.

The research team and spinoff company Palitronica Inc. are now testing the technology—which is designed to complement, not replace, existing security controls such as network intrusion detection—in several Ontario municipalities, with a dozen more interested in participating.

"Ransomware and malware are serious threats to municipal governments ," said Jamie McGarvey, the mayor of Parry Sound and president of the Association of Municipalities Ontario. "We have seen an alarming increase in attacks and are encouraged that the University of Waterloo, the security company Palitronica, and the federal government are working with municipalities to improve municipal IT infrastructure systems."

Fischmeister said the concept at the core of the technology, which is far less vulnerable to tampering since it sits outside the monitored system, means it has a wide variety of potential applications.

"It could be used to protect network equipment and computers, but also

water supply, 5G infrastructure, trains and airplanes—we can protect anything that consumes power," he said.

In the last six years, the technology was developed in projects backed by several government agencies, including the Department of National Defence (DND), and industry partners in defense and critical infrastructure.

"The ability, speed and accuracy of human triage activities of this unique Canadian technology show great promise to efficiently increase the safety and security of our Canadian Armed Forces," said Eric Fournier, director, general innovation, Innovation for Defence, Excellence and Security, at the DND.

Provided by University of Waterloo